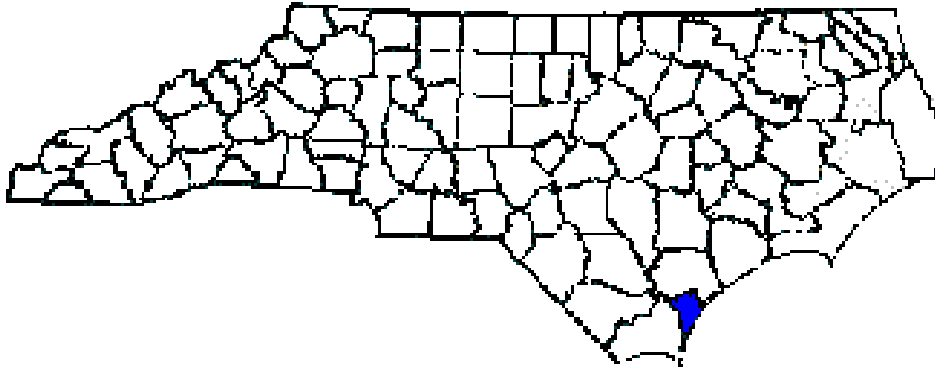
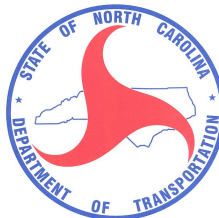


ANNUAL REPORT FOR 2008



**Third Street Bridge Mitigation Site
New Hanover County
TIP No. U-0092A**



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SUMMARY

The following report summarizes the monitoring activities that have occurred in 2008 at the Third Street Bridge Mitigation Site. The 2008-year represents the third year of hydrology and vegetation monitoring following construction. The site must demonstrate hydrologic and vegetation success for a minimum of five years or until the site is deemed successful. The site was constructed to serve as mitigation for impacts associated with the construction of T.I.P. U-0092A for the Smith Creek Parkway in New Hanover County.

In May 2006, monitoring gauges were installed to document groundwater and surface water hydrology at the site. Two groundwater gauges, a surface gauge and one rain gauge were positioned on the mitigation site. Hydrologic success criteria is based on the approved mitigation plan, which required that the site demonstrate inundation or saturation within 12" of the surface for 12.5% of the growing season. The 2008-year represents the third year of hydrologic monitoring for the Third Street Bridge Mitigation Site. Both groundwater-monitoring gauges indicated that the site met the minimum jurisdictional criteria for wetland hydrology above the required 12.5% of the growing season. The surface water gauge also indicated periods of inundation during the 2008-year.

The vegetation is separated into two different planting zones at the site. The two planting zones included the bottomland hardwood area, which is located in between the bridges and the scrub-shrub area, which is located immediately under the Third Street Bridge. The 2008 vegetation monitoring in the bottomland hardwood area yielded 523 trees per acre; with total density of trees/shrubs yielding 262 trees per acre which is below the minimum success criteria of 320 trees per acre. The shrub area however, has demonstrated limited success of planted species. There is some natural regeneration of adjacent shrub species that has occurred, but very little of the planted vegetation is still surviving. NCDOT has investigated, in detail, the shrub area to determine possible explanations for the limited vegetation success. These explanations are further discussed in the vegetation section of the report. NCDOT proposes to continue to monitor the vegetation in the shrub area and proposes to address any permit deficiencies at the end of the five-year monitoring period.

Based on the results from the third year of monitoring, NCDOT proposes to continue to monitor vegetation and hydrology at the Third Street Bridge Mitigation Site during 2009.

1.0 INTRODUCTION

1.1 Project Description

The Third Street Bridge Mitigation Site is located in New Hanover County adjacent to the Smith Creek Parkway. Totalling 1.3 acres in size, the site provides bottomland-hardwood creation mitigation for a portion of the wetland impacts associated with U-0092A.

1.2 Purpose

In order to demonstrate successful mitigation, hydrologic and vegetation monitoring must be conducted for a minimum of five years or until the site is deemed successful. Hydrologic success criteria is based on the approved mitigation plan and require that the site demonstrate inundation or saturation within 12" of the surface for 12.5% of the growing season. Vegetation success criteria states that at least 320 trees/shrubs per acre must survive after the completion of the third growing season and 260 trees/shrubs per acre after the fifth growing season. Included in this report are analyses of hydrologic and vegetation monitoring results, discussions of local climate conditions throughout the growing season and site photographs.

1.3 Project History

Spring 2006	Site Constructed
February 2006	Site Planted
May 2006	Monitoring Gauges Installed
May-November 2006	Hydrologic Monitoring (Year 1)
June 2006	Vegetation Monitoring (Year 1)
May-November 2007	Hydrologic Monitoring (Year 2)
July 2007	Vegetation Monitoring (Year 2)
July 2007	Soil Samples Collected in Shrub Area
November 2007	Site visit to investigate Shrub Area
May-November 2008	Hydrologic Monitoring (Year 3)
September 2008	Vegetation Monitoring (Year 3)

2.0 HYDROLOGY

2.1 Success Criteria

The hydrologic success criteria established for the Third Street Bridge Mitigation Site, as stipulated in the approved mitigation plan, require that the site demonstrate inundation or saturation within 12" of the surface for 12.5% of the growing season.

The growing season in New Hanover County begins on February 27 and ends November 26. The dates correspond to a 50% probability that air temperature will drop to 28°F after February 27 and before November 26¹; thus, the growing season is 273 days. Local climate must represent normal conditions for the area.

2.2 Hydrologic Description

Two groundwater monitoring gauges and one surface water monitoring gauge were installed within the sites' restoration area in May 2006 (Figure 2). The groundwater gauges record groundwater level once per day and the surface water gauge records surface water readings every three hours. A rain gauge is also located on the site to assist in comparison of the rainfall data (supplied by the NC State Climate Office) from an official weather station in Wilmington. Monitoring data for 2008 represents the third year of hydrologic monitoring for the site.

2.3 Results of Hydrologic Monitoring

2.3.1 Site Data

The maximum number of consecutive days that saturation occurred within 12 inches of the ground surface was determined for each groundwater monitoring gauge. This number was converted into a percentage of the 273-day growing season (February 27 – November 26). Table 1 provides the 2008 hydrologic results; Figure 3 is a graphical representation of these results. Appendix A includes graphs of the data recorded at each groundwater and surface water gauge. Daily rainfall events recorded at the official weather station in Wilmington are included on each of the groundwater gauge plots.

¹ Soil Conservation Service, Soil Survey of New Hanover County, North Carolina, 1989.

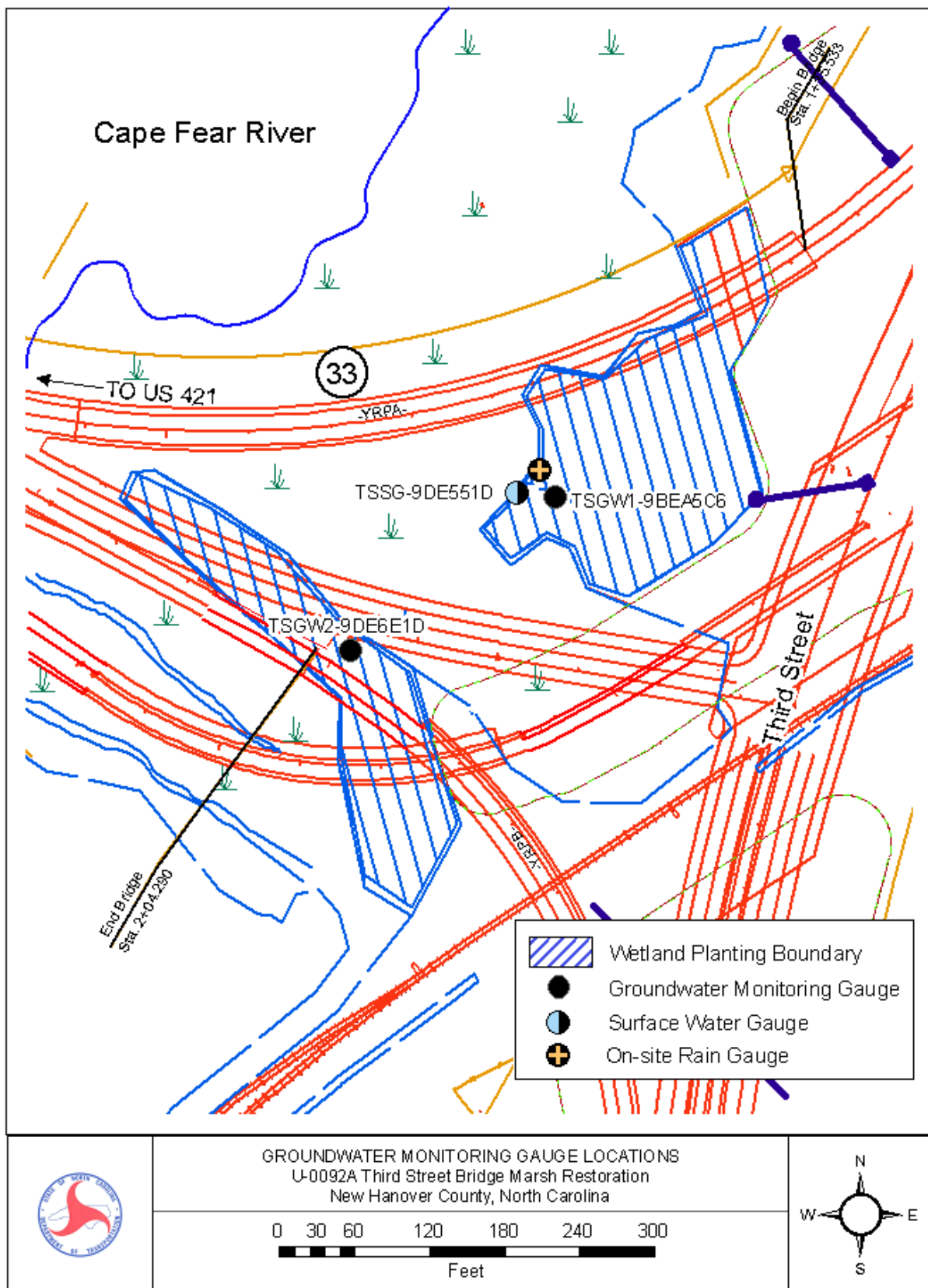


Figure 2. Monitoring Gauge Location Map

Table 1. 2007 Hydrologic Monitoring Results

Monitoring Gauge	< 5%	5-8%	8-12%	> 12.5%	Actual %
TS-GW1				X	100
TS-GW2				X	100

Both groundwater-monitoring gauges indicated that the site met the jurisdictional criteria for wetland hydrology. The surface water gauge also showed periods of inundation during 2008.

2.3.2 Climatic Data

Figure 4 is a comparison of the 2008 monthly rainfall to the historical precipitation (collected between 1976 and 2007) for Wilmington, North Carolina. This comparison gives an indication of how 2008 relates to historical data in terms of climate conditions. The NC State Climate Office provided all local rainfall information.

This graph is used to indicate the general precipitation conditions for the surrounding area. Overall, 2008 exhibited normal rainfall. The data obtained in 2008 indicates that rainfall in the months of January, February, March, April, May, August, and October was normal. The months of July, September, and November was above normal. June was below normal for the 2008 precipitation data.

2.4 Conclusions

The 2008-year represents the third year of hydrologic monitoring for the Third Street Bridge Mitigation Site. Both groundwater-monitoring gauges indicated that the site met the minimum jurisdictional criteria for wetland hydrology required for at least 12.5% of the growing season. The surface water gauge also showed periods of surface water inundation throughout the monitoring year.

NCDOT proposes to continue to monitor the Third Street Bridge Mitigation Site for hydrology in 2009.

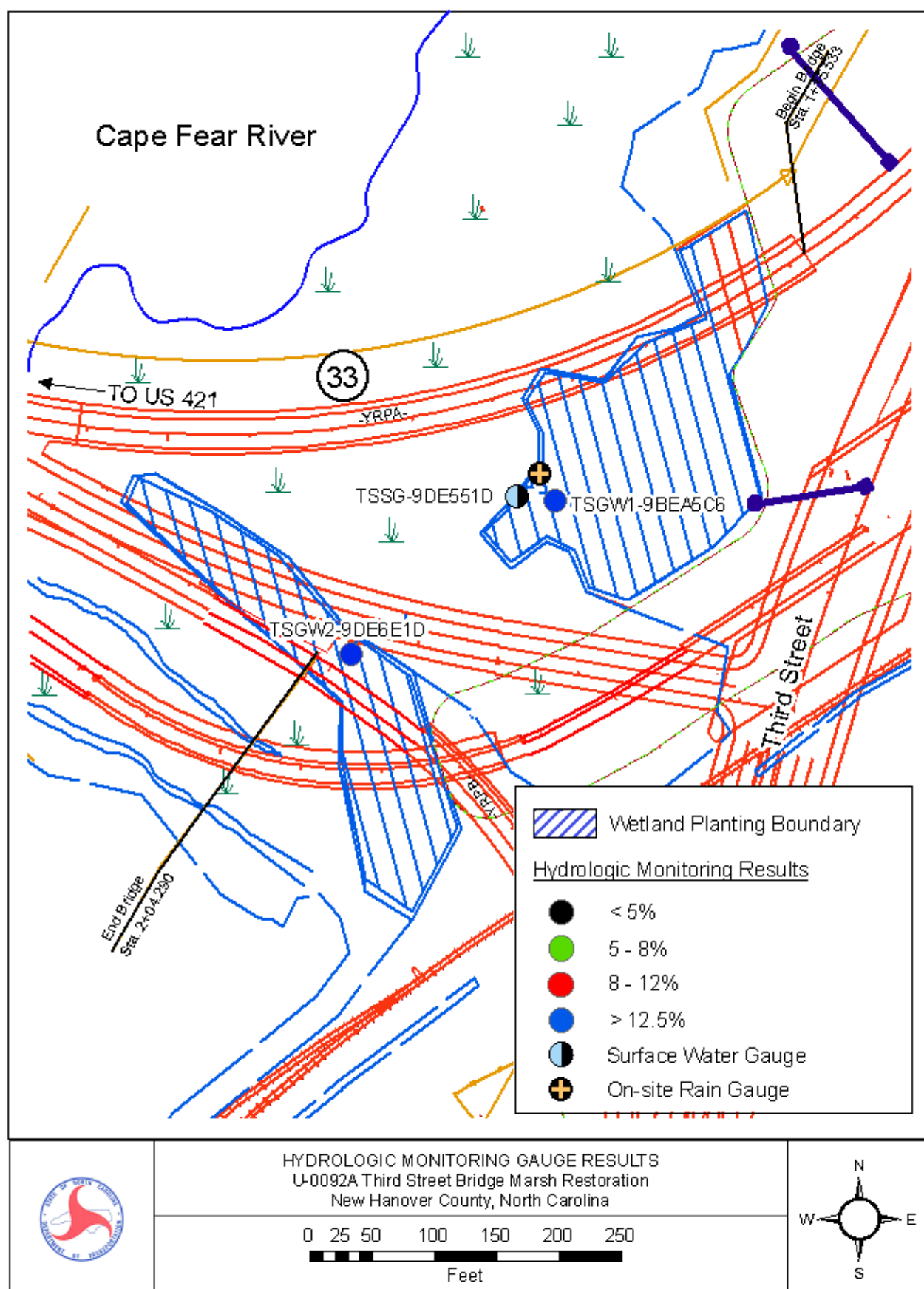
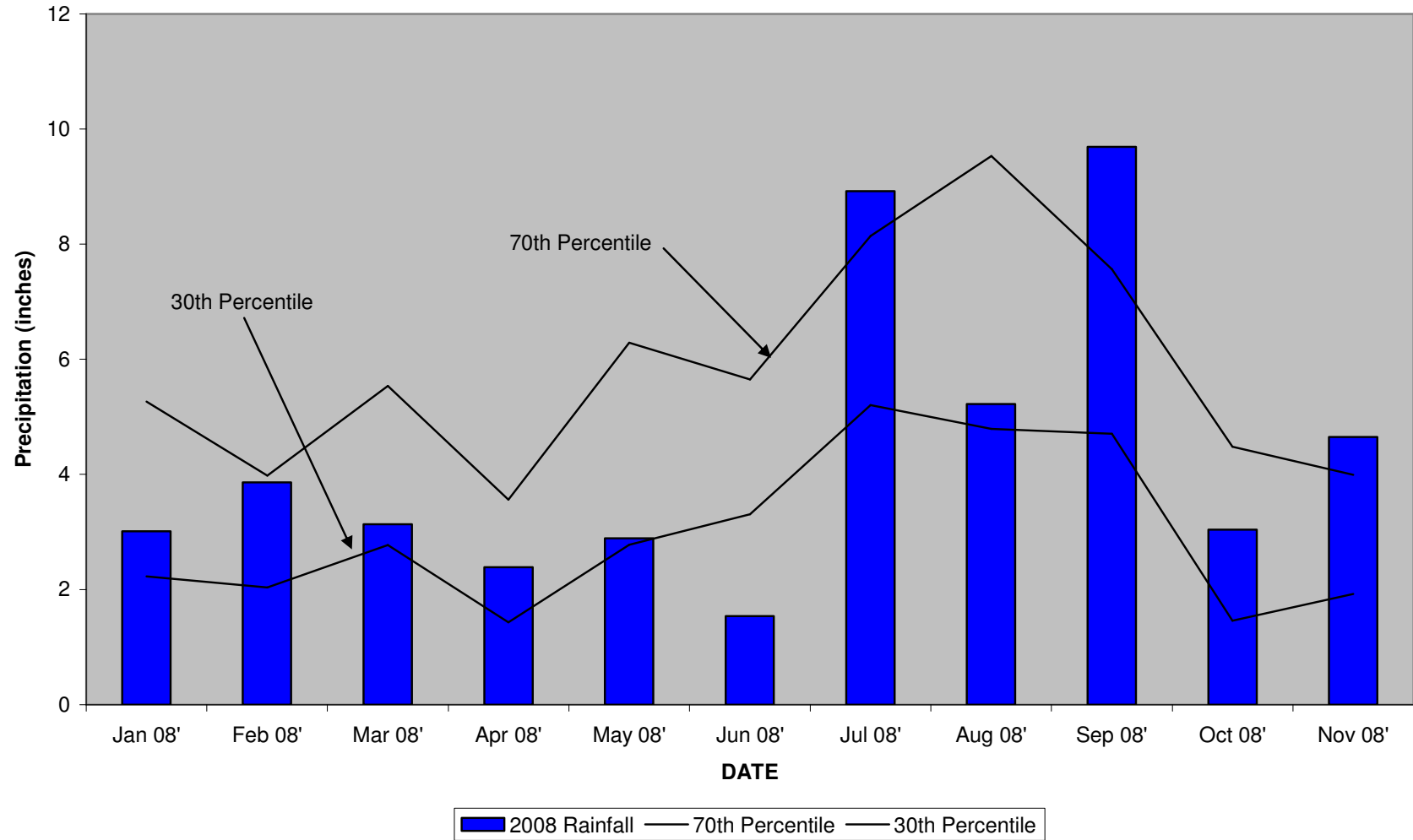


Figure 3. Hydrologic Monitoring Results Map

Figure 4. 30-70 Percentile Graph, Wilmington, NC

**Third Street Bridge 30-70 Graph
Wilmington, NC Monthly Precipitation**



3.0 VEGETATION: THIRD STREET BRIDGE MITIGATION SITE (YEAR 3 MONITORING)

3.1 Success Criteria

The Vegetation Success Criteria states that at least 320 trees/shrubs per acre must survive after the completion of the third growing season and 260 trees/shrubs per acre after the fifth growing season.

3.2 Description of Species

The following tree and shrub species were planted in the Wetland Restoration Area:

Tree Area:

Fraxinus pennsylvanica, Green Ash

Taxodium distichum, Baldcypress

Quercus lyrata, Overcup Oak

Nyssa aquatica, Water Tupelo

Nyssa sylvatica var. *biflora*, Swamp Blackgum

Shrub Area:

Cephalanthus occidentalis, Buttonbush

Aronia arbutifolia, Red Chokeberry

Alnus serrulata, Tag Alder

Itea virginica, Virginia Sweetspire

3.3 Results of Vegetation Monitoring

Table 2. Vegetation Monitoring Results

Plot #	Green Ash	Baldcypress	Swamp Blackgum	Water Tupelo	Overcup Oak	Buttonbush	Red Chokeberry	Tag Alder	Virginia Willow	Total (3 year)	Total (at planting)	Density (Trees/Acre)
1 (Trees)	21	12	2	4	1					40	52	523
2 (Shrubs)										0	45	0
Average Density (Trees & Shrubs/Acre)												262

Site Notes: Other species noted: cattail, vines, *Juncus* sp., phragmites, Black willow, *Pluchea* sp., sedge, woolgrass, *Cyperus* sp., Phragmites, *Baccharis* sp., *Scripus* sp., *Sagittaria* sp., wax myrtle and various grasses.

3.4 Conclusions

There were 2 vegetation monitoring plots established throughout the 1.7 acre planting area. The 2008 vegetation monitoring of the site revealed an average tree density of 262 trees/shrubs per acre. This average is below the minimum success criteria of 320 trees/shrubs per acre for year three. Even though the shrub area is not showing success the bottomland hardwood area is successful. Vegetation survival in the shrub area under the Third Street Bridge has been very limited. There is limited natural regeneration of *Baccharis*, Wax Myrtle, and Black Willow in this area, but very little of the planted vegetation are surviving. NCDOT has investigated the shrub area to determine possible explanation for the limited vegetation success around Plot #2. Several factors have been noted that may contribute to limited success in this area. The shrub area is located directly underneath the bridge, which may be limiting sunlight and rainfall. Due to the bridge construction at the site and the soil type, the ground is extremely compacted. In order to successfully rip or disc the site, large equipment would have to be mobilized. Due to the location of the sites, equipment access is very limited. The site access-issue, along with the cost, makes disking and/or ripping the shrub site impractical. Soil samples were also collected from the site in July 2008. The soil sample results did not indicate any nutrient deficiencies that would be detrimental to the target species or plant growth. It appears that severe soil compaction may be the overriding factor/explanation for the limited vegetation success in the shrub area. NCDOT proposes to continue to monitor the vegetation in the shrub area and proposes to address any permit deficiencies

at the end of the five-year monitoring period. NCDOT proposes to continue to monitor the Third Street Bridge mitigation site for 2009.

4.0 OVERALL CONCLUSIONS/RECOMMENDATIONS

The 2008-year represents the third year of hydrologic monitoring for the Third Street Bridge Mitigation Site. Both groundwater-monitoring gauges indicated that the site met the jurisdictional criteria for wetland hydrology above the required 12.5% of the growing season. The surface water gauge also showed periods of inundation throughout the monitoring year. Vegetation monitoring in the hardwood area yielded 262 trees/shrubs per acre. This average is below the minimum success criteria of 320 trees/shrubs per acre for year three. Even though the shrub area is not showing success the bottomland hardwood area is successful. NCDOT proposes to continue to monitor the Third Street Bridge Mitigation Site for vegetation and hydrology in 2009.

APPENDIX A

GAUGE DATA GRAPHS

APPENDIX B

PHOTO AND VEGETATION PLOT LOCATIONS, SITE PHOTOS

Third Street



Photo 1



Photo 2



Photo 3

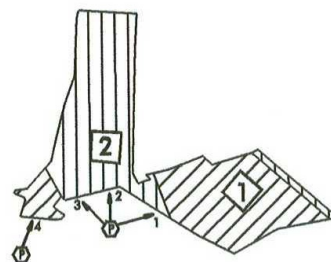






Photo 4

1. The purpose of this map is to show the location of the 3rd Street Mitigation Site. The map is not to scale. The map is for informational purposes only. The map is not to be used for any other purpose.

DATE	10/10/10
BY	XXX
PROJECT	3rd Street Mitigation Site
SCALE	1" = 100'

3rd Street Mitigation Site



-  Tree Area
-  Shrub Area
-  Plot Locations
-  Photo Locations

DATE	10/10/10
BY	XXX
PROJECT	3rd Street Mitigation Site
SCALE	1" = 100'